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## 1 Distributed shared memory in a loosely coupled distributed system

B. D. Fleisch

August 1987 **ACM SIGCOMM Computer Communication Review , Proceedings of the ACM workshop on Frontiers in computer communications technology SIGCOMM '87**, Volume 17 Issue 5

Publisher: ACM Press

Full text available: [pdf\(1.32 MB\)](#)

Additional Information: [full citation](#), [abstract](#), [references](#), [citations](#), [index terms](#)

This work outlines the development and performance validation of an architecture for distributed shared memory in a loosely coupled distributed computing environment. This distributed shared memory may be used for communication and data exchange between communicants on different computing sites; the mechanism will operate transparently and in a distributed manner. This paper describes the architecture of this mechanism and metrics which will be used to measure its performan ...

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Ming-Chit Tam, Jonathan M. Smith, David J. Farber

July 1990 **ACM SIGOPS Operating Systems Review**, Volume 24 Issue 3

Publisher: ACM Press

Full text available: [pdf\(1.96 MB\)](#)

Additional Information: [full citation](#), [abstract](#), [citations](#), [index terms](#)

Two possible modes of Input/Output (I/O)are "sequential" and "random-access", and there is an extremely strong conceptual link between I/O and communication. Sequential communication, typified in the I/O setting by magnetic tape, is typified in the communication setting by a **stream**, e.g., a UNIX<sup>1</sup> pipe. Random-access communication, typified in the I/O setting by a drum or disk device, is typified in the communication setting by **shared memory**. In this paper, we study and s ...

## 3 Techniques for reducing consistency-related communication in distributed shared-memory systems

John B. Carter, John K. Bennett, Willy Zwaenepoel

August 1995 **ACM Transactions on Computer Systems (TOCS)**, Volume 13 Issue 3

Publisher: ACM Press

Full text available: [pdf\(2.86 MB\)](#)

Additional Information: [full citation](#), [abstract](#), [references](#), [citations](#), [index terms](#), [review](#)

Distributed shared memory (DSM) is an abstraction of shared memory on a distributed-memory machine. Hardware DSM systems support this abstraction at the architecture level; software DSM systems support the abstraction within the runtime system. One of the key problems in building an efficient software DSM system is to reduce the amount of communication needed to keep the distributed memories consistent. In this article we present four techniques for doing so: software release consistency; m ...

**Keywords:** cache consistency protocols, distributed shared memory, memory models, release consistency, virtual shared memory

#### 4 A compiler-directed distributed shared memory system

 Tzi-cker Chiueh, Manish Verma

July 1995 **Proceedings of the 9th international conference on Supercomputing**

Publisher: ACM Press

Full text available:  pdf(1.22 MB) Additional Information: [full citation](#), [references](#), [citations](#), [index terms](#)

#### 5 Source-level global optimizations for fine-grain distributed shared memory systems

 R. Veldema, R. F. H. Hofman, R. A. F. Bhoedjang, C. J. H. Jacobs, H. E. Bal

June 2001 **ACM SIGPLAN Notices , Proceedings of the eighth ACM SIGPLAN symposium on Principles and practices of parallel programming PPoPP**

'01, Volume 36 Issue 7

Publisher: ACM Press

Full text available:  pdf(112.60 KB) Additional Information: [full citation](#), [abstract](#), [references](#), [citations](#), [index terms](#)

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#### 6 Preliminary thoughts on problem-oriented shared memory: a decentralized approach to distributed systems

 David R. Cheriton

October 1985 **ACM SIGOPS Operating Systems Review**, Volume 19 Issue 4

Publisher: ACM Press

Full text available:  pdf(1.05 MB) Additional Information: [full citation](#), [abstract](#), [references](#), [citations](#)

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 Donald G. Morris, David K. Lowenthal

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'01, Volume 36 Issue 7

Publisher: ACM Press

Full text available: [pdf\(270.58 KB\)](#) Additional Information: [full citation](#), [abstract](#), [references](#), [citations](#), [index terms](#)

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## 8 An integrated compile-time/run-time software distributed shared memory system

 Sandhya Dwarkadas, Alan L. Cox, Willy Zwaenepoel

September 1996 **ACM SIGPLAN Notices , ACM SIGOPS Operating Systems Review , Proceedings of the seventh international conference on Architectural support for programming languages and operating systems ASPLOS-VII**, Volume 31 , 30 Issue 9 , 5

Publisher: ACM Press

Full text available: [pdf\(1.30 MB\)](#) Additional Information: [full citation](#), [abstract](#), [references](#), [citations](#), [index terms](#)

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## 9 BFXM: a parallel file system model based on the mechanism of distributed shared

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 Qun Li, Jie Jing, Li Xie

October 1997 **ACM SIGOPS Operating Systems Review**, Volume 31 Issue 4

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## 10 Workload decomposition for particle simulation applications on hierarchical

 distributed-shared memory parallel systems with integration of HPF and OpenMP

 Sergio Briguglio, Beniamino Di Martino, Gregorio Vlad

June 2001 **Proceedings of the 15th international conference on Supercomputing**

Publisher: ACM Press

Full text available: [pdf\(194.90 KB\)](#) Additional Information: [full citation](#), [abstract](#), [references](#), [index terms](#)

A crucial issue in programming hierarchical distributed-shared memory systems is the *workload decomposition*. In this paper we address this issue in the framework of porting typical *particle in cell* (PIC) applications on hierarchical distributed-shared memory parallel systems. The workload decomposition we have devised consists in a two-stage procedure: a higher-level decomposition among the computational nodes, and a lower-level one among the processors of each computational nod ...

- 11 Distributed shared memory systems with improved barrier synchronization and data transfer 

Nian-Feng Tzeng, Angkul Kongmunvattana

July 1997 **Proceedings of the 11th international conference on Supercomputing**

Publisher: ACM Press

Full text available:  pdf(1.50 MB) Additional Information: [full citation](#), [references](#), [citations](#), [index terms](#)

- 12 An asynchronous protocol for release consistent distributed shared memory systems 

 Jaeheung Yeo, Heon Y. Yeom, Taesoon Park

March 2000 **Proceedings of the 2000 ACM symposium on Applied computing - Volume**

**2**

Publisher: ACM Press

Full text available:  pdf(889.41 KB) Additional Information: [full citation](#), [references](#), [index terms](#)

**Keywords:** DSM, asynchronous, release consistency

- 13 PLUS: a distributed shared-memory system 

 Roberto Bisiani, Mosur Ravishankar

May 1990 **ACM SIGARCH Computer Architecture News , Proceedings of the 17th annual international symposium on Computer Architecture ISCA '90**, Volume 18 Issue 3a

Publisher: ACM Press

Full text available:  pdf(1.33 MB) Additional Information: [full citation](#), [abstract](#), [references](#), [citations](#), [index terms](#)

PLUS is a multiprocessor architecture tailored to the fast execution of a single multithreaded process; its goal is to accelerate the execution of CPU-bound applications. PLUS supports shared memory and efficient synchronization. Memory access latency is reduced by non-demand replication of pages with hardware-supported coherence between replicated pages. The architecture has been simulated in detail and the paper presents some of the key measurements that have been used to substantiate our ...

- 14 How to share memory in a distributed system 

 Eli Upfal, Avi Wigderson

January 1987 **Journal of the ACM (JACM)**, Volume 34 Issue 1

Publisher: ACM Press

Full text available:  pdf(960.43 KB) Additional Information: [full citation](#), [abstract](#), [references](#), [citations](#), [index terms](#), [review](#)

The power of shared-memory in models of parallel computation is studied, and a novel distributed data structure that eliminates the need for shared memory without significantly increasing the run time of the parallel computation is described. More specifically, it is shown how a complete network of processors can deterministically simulate one PRAM step in  $O(\log n / (\log \log n)^2)$  time when both models use  $n$

- 15 A comprehensive bibliography of distributed shared memory 

 M. Rasit Eskicioglu

January 1996 **ACM SIGOPS Operating Systems Review**, Volume 30 Issue 1

Publisher: ACM Press

Full text available:  pdf(2.08 MB) Additional Information: [full citation](#), [index terms](#)

- 16 Munin: distributed shared memory based on type-specific memory coherence
-  J. K. Bennett, J. B. Carter, W. Zwaenepoel  
February 1990 **ACM SIGPLAN Notices , Proceedings of the second ACM SIGPLAN symposium on Principles & practice of parallel programming PPOPP '90**, Volume 25 Issue 3

Publisher: ACM Press

Full text available:  pdf(1.05 MB)

Additional Information: [full citation](#), [abstract](#), [references](#), [citations](#), [index terms](#)

We are developing Munin, a system that allows programs written for shared memory multiprocessors to be executed efficiently on distributed memory machines. Munin attempts to overcome the architectural limitations of shared memory machines, while maintaining their advantages in terms of ease of programming. Our system is unique in its use of loosely coherent memory, based on the partial order specified by a shared memory parallel program, and in its use of type-specific memory coherence. Ins ...

- 17 Mirage: a coherent distributed shared memory design
-  B. Fleisch, G. Popek  
November 1989 **ACM SIGOPS Operating Systems Review , Proceedings of the twelfth ACM symposium on Operating systems principles SOSP '89**, Volume 23 Issue 5

Publisher: ACM Press

Full text available:  pdf(1.63 MB)

Additional Information: [full citation](#), [abstract](#), [references](#), [citations](#), [index terms](#)

Shared memory is an effective and efficient paradigm for interprocess communication. We are concerned with software that makes use of shared memory in a single site system and its extension to a multimachine environment. Here we describe the design of a distributed shared memory (DSM) system called Mirage developed at UCLA. Mirage provides a form of network transparency to make network boundaries invisible for shared memory and is upward compatible with an existing interfac ...

- 18 CRL: high-performance all-software distributed shared memory
-  K. L. Johnson, M. F. Kaashoek, D. A. Wallach  
December 1995 **ACM SIGOPS Operating Systems Review , Proceedings of the fifteenth ACM symposium on Operating systems principles SOSP '95**, Volume 29 Issue 5

Publisher: ACM Press

Full text available:  pdf(2.02 MB)

Additional Information: [full citation](#), [references](#), [citations](#), [index terms](#)

- 19 Scalable fault-tolerant distributed shared memory
- Florin Sultan, Liviu Iftode, Thu Nguyen  
November 2000 **Proceedings of the 2000 ACM/IEEE conference on Supercomputing (CDROM)**

Publisher: IEEE Computer Society

Full text available:  pdf(247.40 KB)

Additional Information: [full citation](#), [abstract](#), [references](#), [citations](#), [index terms](#)

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This paper shows how a state-of-the-art software distributed shared-memory (DSM) protocol can be efficiently extended to tolerate single-node failures. In particular, we extend a home-based lazy release consistency (HLRC) DSM system with independent checkpointing and logging to volatile memory, targeting shared-memory computing on very large LAN-based clusters. In these environments, where global coordination may be expensive, independent checkpointing becomes critical to scalability. Howev ...

20 Experiences in integrating distributed shared memory with virtual memory management

 R. Ananthanarayanan, Sathis Menon, Ajay Mohindra, Umakishore Ramachandran  
July 1992 **ACM SIGOPS Operating Systems Review**, Volume 26 Issue 3

Publisher: ACM Press

Full text available:  pdf(1.56 MB) Additional Information: [full citation](#), [abstract](#), [citations](#), [index terms](#)

While the duality between message-passing and shared memory for interprocess communication is well-known, the shared memory paradigm has drawn considerable attention in recent times even in distributed systems. Distributed Shared Memory (DSM) is the abstraction for supporting the notion of shared memory in a physically non-shared (distributed) architecture. It gives a uniform set of mechanisms for accessing local and remote memories. Further, by combining shared memory style synchronization with ...

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**1 Preliminary thoughts on problem-oriented shared memory: a decentralized approach**

[to distributed systems](#)

David R. Cheriton

October 1985 **ACM SIGOPS Operating Systems Review**, Volume 19 Issue 4

Publisher: ACM Press

Full text available: [pdf\(1.05 MB\)](#) Additional Information: [full citation](#), [abstract](#), [references](#), [citations](#)

Much of the work to date on distributed systems has focused on the correct choice of *communication paradigm*, stressing (for example) message primitives, remote procedure call, problem- oriented protocols and so on. A distributed system service is then implemented as a module executing on particular server machine that is accessed using these communication facilities. In contrast, the shared *memory paradigm* has been used on multiprocessor and uniprocessor systems. In the shared memo ...

**2 Paradigms 2: An architecture for a wide area distributed system**

Philip Homburg, Maarten van Steen, Andrew S. Tanenbaum  
September 1996 **Proceedings of the 7th workshop on ACM SIGOPS European workshop: Systems support for worldwide applications**

Publisher: ACM Press

Full text available: [pdf\(658.88 KB\)](#) Additional Information: [full citation](#), [abstract](#), [references](#), [citations](#)

Distributed systems provide sharing of resources and information over a computer network. A key design issue that makes these systems attractive is that all aspects related to distribution are transparent to users. Unfortunately, general-purpose wide area distributed systems that allow users to share and manage arbitrary resources in a transparent way hardly exist. In particular, they generally do not take into account the most important properties that characterize wide area systems: 1) A very ...

**3 "Topologies"—distributed objects on multicomputers**

Karsten Schwan, Win Bo  
May 1990 **ACM Transactions on Computer Systems (TOCS)**, Volume 8 Issue 2

Publisher: ACM Press

Full text available: [pdf\(3.83 MB\)](#) Additional Information: [full citation](#), [abstract](#), [references](#), [citations](#), [index terms](#), [review](#)

Application programs written for large-scale multicomputers with interconnection structures known to the programmer (e.g., hypercubes or meshes) use complex

communication structures for connecting the applications' parallel tasks. Such structures implement a wide variety of functions, including the exchange of data or control information relevant to the task computations and/or the communications required for task synchronization; message forwarding/filtering under program control, and so on ...

#### **4 Extending the operating system to support an object-oriented environment**

 J. A. Marques, P. Guedes

September 1989 **ACM SIGPLAN Notices , Conference proceedings on Object-oriented programming systems, languages and applications OOPSLA '89**, Volume 24 Issue 10

Publisher: ACM Press

Full text available:  pdf(1.21 MB)

Additional Information: [full citation](#), [abstract](#), [references](#), [citations](#), [index terms](#)

Comandos is a project within the European Strategic Programme for Research on Information Technology - ESPRIT and it stems from the identified need of providing simpler and more integrated environments for application development in large distributed systems. The fundamental goal of the project is the definition of an integrated platform providing support for distributed and concurrent processing in a LAN environment, extensible and distributed data management and ...

#### **5 Implementation and performance of Munin**

 John B. Carter, John K. Bennett, Willy Zwaenepoel

September 1991 **ACM SIGOPS Operating Systems Review , Proceedings of the thirteenth ACM symposium on Operating systems principles SOSP '91**, Volume 25 Issue 5

Publisher: ACM Press

Full text available:  pdf(1.46 MB)

Additional Information: [full citation](#), [abstract](#), [references](#), [citations](#), [index terms](#)

Munin is a distributed shared memory (DSM) system that allows shared memory parallel programs to be executed efficiently on distributed memory multiprocessors. Munin is unique among existing DSM systems in its use of *multiple consistency protocols* and in its use of *release consistency*. In Munin, shared program variables are annotated with their expected access pattern, and these annotations are then used by the runtime system to choose a consistency protocol best suited to that access ...

#### **6 High-speed distributed data handling for on-line instrumentation systems**

 William E. Johnston, William Greiman, Gary Hoo, Jason Lee, Brian Tierney, Craig Tull, Douglas Olson

November 1997 **Proceedings of the 1997 ACM/IEEE conference on Supercomputing (CDROM)**

Publisher: ACM Press

Full text available:  pdf(438.36 KB) Additional Information: [full citation](#), [abstract](#), [references](#)

The advent (and promise) of shared, widely available, high-speed networks provides the potential for new approaches to the collection, organization, storage, and analysis of high-speed and high-volume data streams from high data-rate, on-line instruments. We have worked in this area for several years, have identified and addressed a variety of problems associated with this scenario, and have evolved an architecture, implementations, and a monitoring methodology that have been successful in addressing ...

#### **7 Design of the Mneme persistent object store**

 J. Eliot B. Moss

April 1990 **ACM Transactions on Information Systems (TOIS)**, Volume 8 Issue 2

Publisher: ACM Press

Additional Information: [full citation](#), [abstract](#), [references](#), [citations](#), [index](#)

Full text available: [pdf\(3.22 MB\)](#)

[terms](#), [review](#)

The Mneme project is an investigation of techniques for integrating programming language and database features to provide better support for cooperative, information-intensive tasks such as computer-aided software engineering. The project strategy is to implement efficient, distributed, persistent programming languages. We report here on the Mneme persistent object store, a fundamental component of the project, discussing its design and initial prototype. Mneme stores objects

**8 CLAM- an open system for graphical user interfaces**

 Lisa A. Call, David L. Cohrs, Barton P. Miller

December 1987 **ACM SIGPLAN Notices , Conference proceedings on Object-oriented programming systems, languages and applications OOPSLA '87**, Volume 22 Issue 12

Publisher: ACM Press

Full text available: [pdf\(1.02 MB\)](#)

Additional Information: [full citation](#), [abstract](#), [references](#), [citations](#), [index terms](#)

CLAM is an object-oriented system designed to support the building of extensible graphical user interfaces. CLAM provides a basic windowing environment with the ability to extend its functions using dynamically loaded C++ classes. The dynamically loaded classes allow for performance tuning (by transparently loading the class in either the client or the CLAM server) and for sharing of new functions. In addition to the traditionally layering of output abstractions, CLAM allows the ...

**9 Office-by-example: an integrated office system and database manager**

 Kyu-Young Whang, Art Ammann, Anthony Bolmarcich, Maria Hanrahan, Guy Hochgesang, Kuan-Tsae Huang, Al Khorasani, Ravi Krishnamurthy, Gary Sockut, Paula Sweeney, Vance Waddle, Moshé Zloof

October 1987 **ACM Transactions on Information Systems (TOIS)**, Volume 5 Issue 4

Publisher: ACM Press

Full text available: [pdf\(2.86 MB\)](#)

Additional Information: [full citation](#), [abstract](#), [references](#), [citations](#), [index terms](#), [review](#)

Office-by-Example (OBE) is an integrated office information system that has been under development at IBM Research. OBE, an extension of Query-by-Example, supports various office features such as database tables, word processing, electronic mail, graphics, images, and so forth. These seemingly heterogeneous features are integrated through a language feature called example elements. Applications involving example elements are processed by the database manager, an integrated ...

**10 Dynamic software testing of MPI applications with umpire**

Jeffrey S. Vetter, Bronis R. de Supinski

November 2000 **Proceedings of the 2000 ACM/IEEE conference on Supercomputing (CDROM)**

Publisher: IEEE Computer Society

Full text available: [pdf\(83.83 KB\)](#)

Additional Information: [full citation](#), [abstract](#), [references](#), [index terms](#)

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As evidenced by the popularity of MPI (Message Passing Interface), message passing is an effective programming technique for managing coarse-grained concurrency on distributed computers. Unfortunately, debugging message-passing applications can be difficult. Software complexity, data races, and scheduling dependencies can make programming errors challenging to locate with manual, interactive debugging techniques. This article describes Umpire, a new tool for detecting programming errors at ...

**11 Distributed shared memory in a loosely coupled distributed system**

B. D. Fleisch

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Publisher: ACM Press

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July 1990 **ACM SIGOPS Operating Systems Review**, Volume 24 Issue 3

Publisher: ACM Press

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Qun Li, Jie Jing, Li Xie

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Sergio Briguglio, Beniamino Di Martino, Gregorio Vlad

June 2001 **Proceedings of the 15th international conference on Supercomputing**

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Nian-Feng Tzeng, Angkul Kongmunvattana

July 1997 **Proceedings of the 11th international conference on Supercomputing**

**Publisher:** ACM Press

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### **The TreadMarks Distributed Shared Memory (DSM) System**

Provides a global **shared address space** across a cluster. Papers and documentation.

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A global survey across all kinds of DSM **systems** is "A. Mohindra, U. Ramachandran, A Survey of **Distributed Shared Memory** in Loosely-coupled **Systems**". ...

[www4.informatik.uni-erlangen.de/Projects/MEMSY/DSM/dsm.html](http://www4.informatik.uni-erlangen.de/Projects/MEMSY/DSM/dsm.html) - 8k -

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### **Distributed Shared Memory: Concepts and Systems**

V. Lo , "Operating Systems Enhancements for **Distributed Shared Memory**," Advances ...

J. , M. and V. , "A Survey of **Distributed Shared Memory Systems**," Proc. ...

[doi.ieeecomputersociety.org/10.1109/88.494605](http://doi.ieeecomputersociety.org/10.1109/88.494605) - [Similar pages](#)

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